

AMENDMENTS

In the Claims:

1. (Currently Amended) A semiconductor laser device comprising:
a first conductivity-type semiconductor substrate;
a first conductivity-type lower clad layer deposited on the first conductivity-type semiconductor substrate;
a lower guide layer deposited on the first conductivity-type lower clad layer;
a quantum well active layer deposited on the lower guide layer;
an upper guide layer deposited on the quantum well active layer; and
a second conductivity-type upper clad layer deposited on the upper guide layer, stacked in this order,

wherein the upper guide layer and the lower guide layer are made of an AlGaAs based material,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, ~~and~~

wherein the quantum well active layer is made of a non-Al based material, ~~and is~~
wherein the quantum well active layer and the upper guide layer are doped with a second conductivity type of impurity.

2. (Withdrawn) A semiconductor laser device having an oscillation wavelength larger than 760 nm and smaller than 800 nm, the semiconductor laser device comprising:
a first conductivity-type GaAs substrate;
a quantum well active layer deposited on the first conductivity-type GaAs substrate;
a second conductivity-type upper clad layer deposited on the quantum well active layer, and

a guide layer made of an AlGaAs-based material,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer which are made of an InGaAsP based material, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is doped with Zn as a second conductivity type of impurity.

3. (Withdrawn) A semiconductor laser device, comprising:

a first conductivity-type GaAs substrate;

a quantum well active layer deposited on the first conductivity-type GaAs substrate;

a second conductivity-type upper clad layer deposited on the quantum well active layer, and

a guide layer made of an AlGaAs-based material,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer which are made of an InGaAsP based material, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers,

wherein the quantum well active layer is doped with Zn as a second conductivity type of impurity, and

wherein a concentration of Zn doped in the quantum well active layer is $2 \times 10^{17} \text{ cm}^{-3}$ or less.

4. (Withdrawn) A semiconductor laser device, comprising:

a first conductivity-type semiconductor substrate;

a first conductivity-type lower clad layer deposited on the first conductivity-type semiconductor substrate;

a first guide layer made of an AlGaAs-based material deposited on the first conductivity-type lower clad layer;

a quantum well active layer deposited on the first guide layer;

a second guide layer made of an AlGaAs-based material deposited on the quantum well active layer; and

a second conductivity-type upper clad layer deposited on the second guide layer,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is made of a non-Al based material and is doped with a second conductivity type of impurity.

5. (Withdrawn) The semiconductor laser device as defined in Claim 4, wherein a mixed crystal ratio of Al in the AlGaAs-based material that constitutes the guide layers is larger than 0.2.

6. (Withdrawn) The semiconductor laser device as defined in Claim 2, wherein the well layer has a compressive strain.

7. (Withdrawn) The semiconductor laser device as defined in Claim 6, wherein quantity of the compressive strain is 3.5% or less.

8. (Withdrawn) The semiconductor laser device as defined in Claim 6, wherein the barrier layer has a tensile strain.

9. (Withdrawn) The semiconductor laser device as defined in Claim 8, wherein quantity of the tensile strain is 3.5% or less.

10. (Original) An optical disk reproducing and recording unit comprising the semiconductor laser device as defined in Claim 1.

11. (Currently Amended) A semiconductor laser device comprising:
a first conductivity-type semiconductor substrate;
a first conductivity-type lower clad layer deposited on the first conductivity-type semiconductor substrate;
a lower guide layer deposited on the first conductivity-type lower clad layer;
a quantum well active layer deposited on the lower guide layer;
an upper guide layer deposited on the quantum well active layer; and
a second conductivity-type upper clad layer deposited on the upper guide layer, stacked in this order,

wherein the upper guide layer and the lower guide layer are made of an AlGaAs based material,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, ~~and~~

wherein the quantum well active layer is made of a non-Al based material, and is
wherein the quantum well active layer and the lower guide layer are doped with a first
conductivity type of impurity.

12. (Withdrawn) A semiconductor laser device having an oscillation wavelength larger than 760 nm and smaller than 800 nm, the semiconductor laser device comprising:

a first conductivity-type GaAs substrate;

a first conductivity-type lower clad layer deposited on the first conductivity-type GaAs substrate;

a quantum well active layer deposited on the first conductivity-type lower clad layer;

a second conductivity-type upper clad layer deposited on the quantum well active layer, and

a guide layer made of an AlGaAs-based material,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer which are made of an InGaAsP based material, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is doped with Si as a first conductivity type of impurity.

13. (Withdrawn) The semiconductor laser device as defined in Claim 12, wherein a concentration of Si doped in the quantum well 15 active layer is $2 \times 10^{17} \text{ cm}^{-3}$ or less.

14. (Withdrawn) A semiconductor laser device, comprising:

a first conductivity-type semiconductor substrate;

a first conductivity-type lower clad layer deposited on the first conductivity-type semiconductor substrate;

a first guide layer made of an AlGaAs-based material deposited on the first conductivity-type lower clad layer

a quantum well active layer directly deposited on the first guide layer;

a second guide layer made of an AlGaAs-based material deposited on the quantum well active layer; and

a second conductivity-type upper clad layer deposited on the second guide layer,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is made of a non-Al based material and is doped with a first conductivity type of impurity.

15. (Withdrawn) The semiconductor laser device as defined in Claim 14, wherein a mixed crystal ratio of Al in the AlGaAs-based material that constitutes the guide layers is larger than 0.2.

16. (Withdrawn) The semiconductor laser device as defined in Claim 12, wherein the well layer has a compressive strain.

17. (Withdrawn) The semiconductor laser device as defined in Claim 16, wherein quantity of the compressive strain is 3.5% or less.

18. (Withdrawn) The semiconductor laser device as defined in Claim 16, wherein the barrier layer has a tensile strain.

19. (Withdrawn) The semiconductor laser device as defined in Claim 18, wherein quantity of the tensile strain is 3.5% or less.

20. (Original) An optical disk reproducing and recording unit comprising the semiconductor laser device as defined in Claim 11.

21. (Currently Amended) A manufacturing method of a semiconductor laser device, comprising:

depositing a first conductivity-type lower clad layer on a first conductivity-type semiconductor substrate;

depositing a lower guide layer on the first conductivity-type lower clad layer;

depositing a quantum well active layer on the lower guide layer;

depositing an upper guide layer on the quantum well active layer; and

depositing a second conductivity-type upper clad layer on the upper guide layer,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is made of a non-Al based material, and is

wherein the quantum well active layer and the lower guide layer are grown while being doped with a second conductivity type of impurity.

22. (Withdrawn) A manufacturing method of a semiconductor laser device having an oscillation wavelength larger than 760 nm and smaller than 800 nm, the manufacturing method comprising:

depositing a first conductivity-type lower clad layer on a first conductivity-type GaAs substrate;

depositing a quantum well active layer on the first conductivity-type lower clad layer; and

depositing a second conductivity-type upper clad layer on the quantum well active layer,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer which are made of an InGaAsP based material, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is grown while being doped with Zn as a second conductivity type of impurity.

23. (Withdrawn) A manufacturing method of a semiconductor laser device having an oscillation wavelength larger than 760 nm and smaller than 800 nm, the manufacturing method comprising:

depositing a first conductivity-type lower clad layer on a first conductivity-type GaAs substrate;

depositing a quantum well active layer on the first conductivity-type lower clad layer; and

depositing a second conductivity-type upper clad layer on the quantum well active layer,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer which are made of an InGaAsP based material, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers,

wherein the quantum well active layer is grown while being doped with Zn as a second conductivity type of impurity, and

wherein Zn is so doped that a concentration thereof in the quantum well active layer is $2 \times 10^{17} \text{ cm}^{-3}$ or less.

24. (Currently Amended) A manufacturing method of a semiconductor laser device, comprising:

depositing a first conductivity-type lower clad layer on a first conductivity-type semiconductor substrate;

depositing a lower guide layer on the first conductivity-type lower clad layer;

depositing a quantum well active layer on the lower guide layer;

depositing an upper guide layer on the quantum well active layer; and

depositing a second conductivity-type upper clad layer on the upper guide layer,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is made of a non-Al based material, and is

wherein the quantum well active layer and the lower guide layer are grown while being

doped with a first conductivity type of impurity.

25. (Previously Presented) A manufacturing method of a semiconductor laser device having an oscillation wavelength larger than 760 nm and smaller than 800 nm, the manufacturing method comprising:

depositing a first conductivity-type lower clad layer on a first conductivity-type GaAs substrate;

depositing a lower guide layer made of an AlGaAs based material on the first conductivity-type lower clad layer;

depositing a quantum well active layer on the lower guide layer;

depositing an upper guide layer made of an AlGaAs based material on the quantum well active layer; and

depositing a second conductivity-type upper clad layer on the upper guide layer,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer which are made of an InGaAsP based material, and the barrier layers and the well layers are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is grown while being doped with Si as a first conductivity type of impurity.

26. (Previously Presented) The manufacturing method of the semiconductor laser device as defined in Claim 25, wherein Si is so doped that a concentration thereof in the quantum well active layer is $2 \times 10^{17} \text{cm}^{-3}$ or less.

27. (Previously Presented) A manufacturing method of a semiconductor laser device having an oscillation wavelength larger than 760 nm and smaller than 800 nm, the manufacturing method comprising:

depositing a first conductivity-type lower clad layer on a first conductivity-type GaAs substrate;

depositing a lower guide layer made of an AlGaAs based material on the first conductivity-type lower clad layer;

depositing a quantum well active layer on the lower guide layer;

depositing an upper guide layer made of an AlGaAs based material on the quantum well active layer; and

depositing a second conductivity-type upper clad layer on the upper guide layer,

wherein the quantum well active layer comprises at least two barrier layers and at least one well layer which are made of an InGaAsP based material and the barrier layers and the well layers

are alternately stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers, and

wherein the quantum well active layer is grown while being doped with Zn as a second conductivity type of impurity.

28. (Previously Presented) The manufacturing method of the semiconductor laser device as defined in claim 27, wherein Zn is so doped that a concentration thereof in the quantum well active layer is $2 \times 10^{17} \text{ cm}^{-3}$ or less.

29. (Previously Presented) The manufacturing method of the semiconductor laser device as defined in claim 21, wherein, as the second conductivity type of impurity, Zn is so doped, that a concentration thereof in the quantum well active layer is $2 \times 10^{17} \text{ cm}^{-3}$ or less.

30. (Previously Presented) The manufacturing method of the semiconductor laser device as defined in claim 24, wherein, as the first conductivity type of impurity, Si is so doped, that a concentration thereof the quantum well active layer is $2 \times 10^{17} \text{ cm}^{-3}$ or less.

31-32. (Canceled).

33. (Currently Amended) The semiconductor laser device as defined in claim [[31]] 1, wherein

Zn is used as the second conductivity type of impurity in the quantum well active layer and the upper guide layer.

34. (Currently Amended) The semiconductor laser device as defined in claim ~~[[33]]~~ 1,
wherein

a concentration of Zn is $2 \times 10^{17} \text{ cm}^{-3}$ or less.

35. (Currently Amended) The semiconductor laser device as defined in claim ~~[[32]]~~ 11,
wherein

Si is used as the first conductivity type of impurity in the quantum well active layer and the lower guide layer.

36. (Previously Presented) The semiconductor laser device as defined in claim 35, wherein
a concentration of Si is $2 \times 10^{17} \text{ cm}^{-3}$ or less.

37. (Currently Amended) The semiconductor laser device as defined in claim ~~[[31]]~~ 1,
wherein

a mixed crystal ratio of Al in AlGaAs-based material that constitutes the upper guide layer is
a homogeneous value larger than 0.2.

38. (Currently Amended) The semiconductor laser device as defined in claim ~~[[32]]~~ 11,
wherein

a mixed crystal ratio of Al in AlGaAs-based material that constitutes the lower guide layer is
a homogeneous value larger than 0.2.

39. (Previously Presented) The manufacturing method of the semiconductor laser device as
defined in claim 21, wherein

the upper guide layer is grown while being doped with the second conductivity type of impurity.

40. (Previously Presented) The manufacturing method of the semiconductor laser device as defined in claim 24, wherein

the lower guide layer is grown while being doped with the first conductivity type of impurity.

41. (New) The semiconductor laser device as defined in claim 1, wherein

the lower guide layer and a lower portion of the quantum well active layer are doped with a first conductivity type of impurity.